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(71) 出願人 000005234

富士電機株式会社

神奈川県川崎市川崎区田辺新田1番1号

(72) 発明者 伊藤 富男

神奈川県川崎市川崎区田辺新田1番1号

富士電機株式会社内

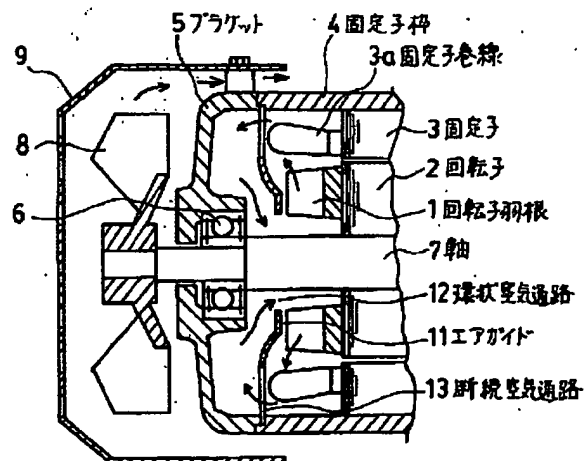
(74) 代理人 弁理士 山口 巖

(54) 【発明の名称】 全閉外扇形回転電機

(57) 【要約】

【目的】 全閉外扇形回転電機の軸受と固定子巻線の冷却を改善して軸受の寿命を長くする。

【構成】 回転子羽根1を端面に持つ回転子2の外側に空隙を介して配置される固定子3と、この固定子3を固着する固定子枠4の端部を覆うブラケット5と、このブラケット5に取付けた軸受6で回転自在に支承され前記回転子2を固着する軸7と、前記ブラケット5を貫通する前記軸7の端部に取付けられる外扇8と、この外扇8を覆うファンカバー9とからなるものにおいて、前記固定子枠4に環状の板からなるエアガイド11を取付けて前記軸7との間に軸方向の環状空気通路12を形成するとともに、前記エアガイド11の内周部を前記回転子羽根1に接近させ、外周部に円周方向に断続する断続空気通路13を形成する。



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## 【特許請求の範囲】

【請求項1】 回転子羽根を端面に持つ回転子の外側に空隙を介して配置される固定子と、この固定子を固着する固定子枠の端部を覆うブラケットと、このブラケットに取付けた軸受で回転自在に支承され前記回転子を固着する軸と、前記ブラケットを貫通する前記軸の端部に取付けられる外扇と、この外扇を覆うファンカバーとからなる全閉外扇形回転電機において、前記固定子枠に環状の板からなるエアガイドを取付けて前記軸との間に軸方向の環状空気通路を形成するとともに、前記エアガイドの内周部を前記回転子羽根に接近させ、外周部に円周方向に断続する断続空気通路を形成することを特徴とする全閉外扇形回転電機。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】 この発明は、冷却を改善した全閉外扇形回転電機に関する。

【0002】

【従来の技術】 図2は従来例の断面図であり、この全閉外扇形回転電機は、回転子羽根1を端面に持つ回転子2の外側に空隙を介して配置される固定子3と、この固定子3を固着する固定子枠4の端部を覆うブラケット5と、このブラケット5に取付けた軸受6で回転自在に支承され前記回転子2を固着する軸7と、前記ブラケット5を貫通する前記軸7の端部に取付けられる外扇8と、この外扇8を覆うファンカバー9とからなり、前記固定子3は固定子巻線3aを持つ。

【0003】

【発明が解決しようとする課題】 前記の従来例によれば、固定子枠4とブラケット5とからなる外被の外側を流れる外扇の冷却風により、回転電機は冷却される。しかし軸受6の領域のブラケット5には冷却風は流れず、また外被の中の内気は回転子羽根1による攪拌の程度にとどまるので、軸受6の冷却はあまり良くない。そして回転子2からの熱が軸7を介して軸受6に伝わるので、軸受6及びその潤滑剤は、どちらかといえば常に高温に曝される。また固定子巻線3aも、主に固定子4の鉄心を介して冷却されるのみで、冷却が良いとはいえない。

【0004】 この発明の目的は、軸受と固定子巻線の冷却を改善することができる全閉外扇形回転電機を提供することにある。

【0005】

【課題を解決するための手段】 この発明の全閉外扇形回転電機は、回転子羽根1を端面に持つ回転子2の外側に空隙を介して配置される固定子3と、この固定子3を固着する固定子枠4の端部を覆うブラケット5と、このブラケット5に取付けた軸受6で回転自在に支承され前記回転子2を固着する軸7と、前記ブラケット5を貫通する前記軸7の端部に取付けられる外扇8と、この外扇8を覆うファンカバー9とからなる全閉外扇形回転電機に

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において、前記固定子枠4に環状の板からなるエアガイド11を取付けて前記軸7との間に軸方向の環状空気通路12を形成するとともに、前記エアガイド11の内周部を前記回転子羽根1に接近させ、外周部に円周方向に断続する断続空気通路13を形成するものである。

【0006】

【作用】 図1を参照して、エアガイド11の内周部は、前記回転子羽根1に接近しているから前記回転子羽根1が発生するファン作用に吸込側と吐出側とを形成する。そして吸込側に環状空気通路12を、吐出側に断続空気通路13をもつことになり、回転電機の外被の中の内気は、回転子羽根1、断続空気通路13及び環状空気通路12、回転子羽根1の順に攪拌なくスムーズに環状に循環する。このため、吸込空気はブラケット5の外周の内面で冷却されてから軸受6の部分を通して、軸受6をよく冷却し、吐出空気は固定子巻線3aの端部まで届いてこれをよく冷却する。

【0007】

【実施例】 図1は実施例の断面図である。従来例と同一符号をつけるものはおよそ同一機能を持ち、この全閉外扇形回転電機は、回転子羽根1を端面に持つ回転子2の外側に空隙を介して配置される固定子3と、この固定子3を固着する固定子枠4の端部を覆うブラケット5と、このブラケット5に取付けた軸受6で回転自在に支承され前記回転子2を固着する軸7と、前記ブラケット5を貫通する前記軸7の端部に取付けられる外扇8と、この外扇8を覆うファンカバー9とからなり、前記固定子3は固定子巻線3aを持つ。

【0008】 実施例の特徴的な構造として、前記固定子枠4に環状のエアガイド11を取付ける。このエアガイド11は、前記軸7との間に軸方向の環状空気通路12を形成するとともに、エアガイド11の内周部を前記回転子羽根1に接近させる。そして外周部に円周方向に断続する断続空気通路13を形成する。この断続空気通路13は、扇状の穴を円周方向に配列してもよいし、外側から切り込むU字状の切欠けを円周方向に配列してもよく、固定子枠4との結合を可能にする。

【0009】 このような構造によれば、エアガイド11の内周部は、前記回転子羽根1に接近しているから前記回転子羽根1が発生するファン作用に吸込側と吐出側とを形成する。そして吸込側に環状空気通路12を、吐出側に断続空気通路13をもつことになり、回転電機の外被の中の内気は、回転子羽根1、断続空気通路13、環状空気通路12、回転子羽根1の順に攪拌なくスムーズに環状に循環する。このため、吸込空気はブラケット5の外周の内面で冷却されてから軸受6の部分を通して、軸受6をよく冷却し、吐出空気は固定子巻線3aの端部まで届いてこれをよく冷却する。

【0010】

【発明の効果】 この発明の全閉外扇形回転電機は、回転

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子羽根を端面に持つ回転子の外側に空隙を介して配置される固定子と、この固定子を固着する固定子枠の端部を覆うブラケットと、このブラケットに取付けた軸受で回転自在に支承され前記回転子を固着する軸と、前記ブラケットを貫通する前記軸の端部に取付けられる外扇と、この外扇を覆うファンカバーとからなる全閉外扇形回転電機において、前記固定子枠に環状の板からなるエアガイドを取付けて前記軸との間に軸方向の環状空気通路を形成するとともに、前記エアガイドの内周部を前記回転子羽根に接近させ、外周部に円周方向に断続する断続空気通路を形成するものである。

【0011】このような構成によれば、エアガイドによる回転子羽根のファン作用の発生により、回転電機の外被の中の内気は、回転子羽根、断続空気通路、環状空気通路、回転子羽根1の順に攪拌なくスムーズに環状に循環する。このため、吸込空気はブラケットの外周の内面で冷却されてから軸受の部分を通して、軸受をよく冷却し、吐出空気は固定子巻線の端部まで届いてこれをよ

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く冷却するという効果があり、特に軸受寿命が長くなるという効果がある。

【図面の簡単な説明】

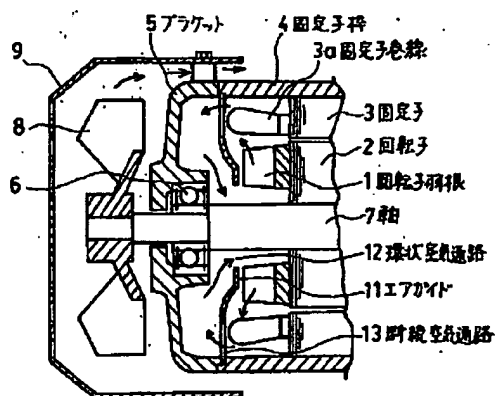
【図1】実施例の断面図

【図2】従来例の断面図

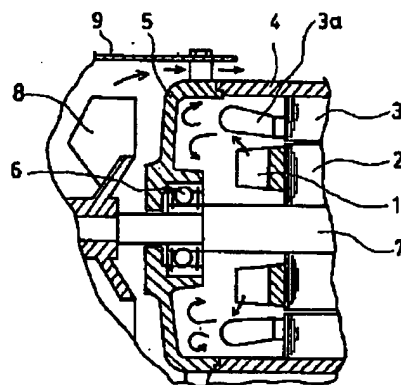
【符号の説明】

- 1 回転子羽根
- 2 回転子
- 3 固定子
- 3a 固定子巻線
- 4 固定子枠
- 5 ブラケット
- 6 軸受
- 7 軸
- 8 外扇
- 11 エアガイド
- 12 環状空気通路
- 13 断続空気通路

【図1】



【図2】



# PATENT ABSTRACTS OF JAPAN

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F16C 37/00

(21)Application number : 03-154978

(71)Applicant : FUJI ELECTRIC CO LTD

(22)Date of filing : 27.06.1991

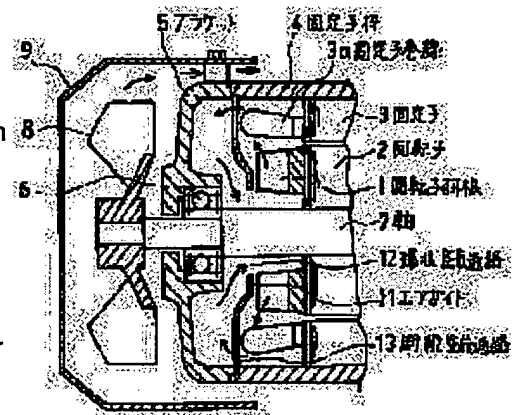
(72)Inventor : ITO TOMIO

## (54) FULL-ENCLOSED FAN-CLOSED ROTARY ELECTRIC MACHINE

### (57)Abstract:

**PURPOSE:** To improve cooling effects on the bearing and stator winding of a full-enclosed fan-cooled rotary electric machine so as to prolong the service life of the bearing.

**CONSTITUTION:** This full-enclosed fan-cooled rotary electric machine is provided with a stator 3 which is provided on the outside of a rotor 2 fitted with rotor vanes 1 at its end face with a gap in between, bracket 5 which covers the end section of a stator frame 4 fixing the stator 3, shaft 7 which is supported by a bearing 6 fitted to the bracket 5 in a freely rotatable state and fixes the rotor 2, outer fan 8 fitted to the end section of the shaft 7 passing through the bracket 5, and fan cover 9 which covers the fan 8. In addition, an annular air passage 12 is formed in the axial direction between an air guide 11 and the shaft 7 by fitting the guide 11 composed of an annular plate to the frame 4 and, at the same time, an intermittent air passage 13 which is intermittent in the circumferential direction is formed on the outer peripheral section of the guide 11 by bringing the inner peripheral section of the guide 11 closer to the rotor vanes 1.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

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[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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**CLAIMS**

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[Claim(s)]

[Claim 1] A stator arranged through an opening on the outside of a rotator which has a rotator wing in an end face It is a wrap bracket about an edge of a stator frame which fixes this stator. A shaft which the support of the revolution of is made free to this bracket by mounting beam bearing, and fixes said rotator An outside fan attached in an edge of said shaft which penetrates said bracket It is a wrap fan cover about an outside [ this ] fan. It is the totally-enclosed-fancooled-type dynamo-electric machine equipped with the above, and while attaching an air guide which becomes said stator frame from an annular board and forming an annular air duct of shaft orientations between said shafts, the inner circumference section of said air guide is made to approach said rotator wing, and it is characterized by forming an intermittence air duct which is intermittent in the periphery section at a circumferencial direction.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the totally-enclosed-fancooled-type dynamo-electric machine which has improved cooling.

[0002]

[Description of the Prior Art] Drawing 2 is the cross section of the conventional example. This totally-enclosed-fancooled-type dynamo-electric machine The stator 3 arranged through an opening on the outside of the rotator 2 which has the rotator wing 1 in an end face, The shaft 7 which the support of the revolution of is made free to the wrap bracket 5 and this bracket 5 by the mounting beam bearing 6 in the edge of the stator frame 4 which fixes this stator 3, and fixes said rotator 2, Consisting of a wrap fan cover 9 the outside fan 8 attached in the edge of said shaft 7 which penetrates said bracket 5, and the outside [ this ] fan 8, said stator 3 has stator winding 3a.

[0003]

[Problem(s) to be Solved by the Invention] According to the aforementioned conventional example, and a dynamo-electric machine is cooled more. [ the outside fan which flows the outside of a jacket which consists of a stator frame 4 and a bracket 5 ] [ of cooling ] However, since a cooling wind does not flow to the bracket 5 of the field of bearing 6 and the inner mind in a jacket remains in the degree of stirring by the rotator wing 1, cooling of bearing 6 is not so good. And since the heat from a rotator 2 gets across to bearing 6 through a shaft 7, bearing 6 and its lubricant are rather always put to an elevated temperature. Moreover, stator winding 3a cannot say that cooling is good only in mainly being cooled through the iron core of a stator 4, either.

[0004] The object of this invention is to offer the totally-enclosed-fancooled-type dynamo-electric machine which can improve cooling of bearing and a stator winding.

[0005]

[Means for Solving the Problem] The stator 3 arranged through an opening on the outside of a rotator 2 where a totally-enclosed-fancooled-type dynamo-electric machine of this invention has the rotator wing 1 in an end face, The shaft 7 which the support of the revolution of is made free to the wrap bracket 5 and this bracket 5 by the mounting beam bearing 6 in an edge of the stator frame 4 which fixes this stator 3, and fixes said rotator 2, In a totally-enclosed-fancooled-type dynamo-electric machine which consists of a wrap fan cover 9 the outside fan 8 attached in an edge of said shaft 7 which penetrates said bracket 5, and the outside [ this ] fan 8 While attaching the air guide 11 which becomes said stator frame 4 from an annular board and forming the annular air duct 12 of shaft orientations between said shafts 7, the inner circumference section of said air guide 11 is made to approach said rotator wing 1, and the intermittence air duct 13 which is intermittent in the periphery section at a circumferencial direction is formed.

[0006]

[Function] With reference to drawing 1 , since the inner circumference section of an air guide 11 is approaching said rotator wing 1, it forms a discharge side in the fan operation which said rotator wing 1 generates an intake side. And to an intake side, it will have the intermittence air duct 13 for the annular air duct 12 in a discharge side, and circulates through the inner mind in the jacket of a dynamo-electric machine annularly smoothly without stirring at the order of the rotator wing 1, the intermittence air duct 13 and the annular air duct 12, and the rotator wing 1. For this reason, intake air passes the portion of bearing 6, after being cooled by the inner surface of the periphery of a bracket 5, it cools bearing 6 well, and regurgitation air arrives to the edge of stator winding 3a, and cools this well.

[0007]

[Example] Drawing 1 is the cross section of an example. What attaches the same sign as the conventional example has the same function about. This totally-enclosed-fancooled-type dynamo-electric machine The stator 3 arranged through

an opening on the outside of the rotator 2 which has the rotator wing 1 in an end face, The shaft 7 which the support of the revolution of is made free to the wrap bracket 5 and this bracket 5 by the mounting beam bearing 6 in the edge of the stator frame 4 which fixes this stator 3, and fixes said rotator 2, Consisting of a wrap fan cover 9 the outside fan 8 attached in the edge of said shaft 7 which penetrates said bracket 5, and the outside [ this ] fan 8, said stator 3 has stator winding 3a.

[0008] The annular air guide 11 is attached in said stator frame 4 as characteristic structure of an example. This air guide 11 makes the inner circumference section of an air guide 11 approach said rotator wing 1 while forming the annular air duct 12 of shaft orientations between said shafts 7. And the intermittence air duct 13 which is intermittent to a circumferencial direction is formed in the periphery section. This intermittence air duct 13 may arrange a flabellate form hole to a circumferencial direction, may arrange the OFF chip of the shape of U character deeply cut from an outside to a circumferencial direction, and enables association with the stator frame 4.

[0009] According to such structure, since said rotator wing 1 is approached, the inner circumference section of an air guide 11 forms a discharge side in the fan operation which said rotator wing 1 generates an intake side. And to an intake side, it will have the intermittence air duct 13 for the annular air duct 12 in a discharge side, and circulates through the inner mind in the jacket of a dynamo-electric machine annularly smoothly without stirring at the order of the rotator wing 1, the intermittence air duct 13, the annular air duct 12, and the rotator wing 1. For this reason, intake air passes the portion of bearing 6, after being cooled by the inner surface of the periphery of a bracket 5, it cools bearing 6 well, and regurgitation air arrives to the edge of stator winding 3a, and cools this well.

[0010]

[Effect of the Invention] The stator arranged through an opening on the outside of a rotator where the totally-enclosed-fancooled-type dynamo-electric machine of this invention has a rotator wing in an end face, The shaft which the support of the revolution of is made free to a wrap bracket and this bracket by mounting beam bearing in the edge of the stator frame which fixes this stator, and fixes said rotator, In the totally-enclosed-fancooled-type dynamo-electric machine which consists of a wrap fan cover the outside fan attached in the edge of said shaft which penetrates said bracket, and an outside [ this ] fan While attaching the air guide which becomes said stator frame from an annular board and forming the annular air duct of shaft orientations between said shafts, the inner circumference section of said air guide is made to approach said rotator wing, and the intermittence air duct which is intermittent in the periphery section at a circumferencial direction is formed.

[0011] According to such a configuration, it circulates through the inner mind in the jacket of a dynamo-electric machine annularly smoothly according to generating of a fan operation of the rotator wing by the air guide that there is no stirring in the order of the rotator wing, intermittence air duct, annular air duct, and rotator wing 1. For this reason, intake air passes bearing portions, after being cooled by the inner surface of the periphery of a bracket, it cools bearing well, and regurgitation air arrives to the edge of a stator winding, is effective in cooling this well, and effective in especially a bearing life becoming long.

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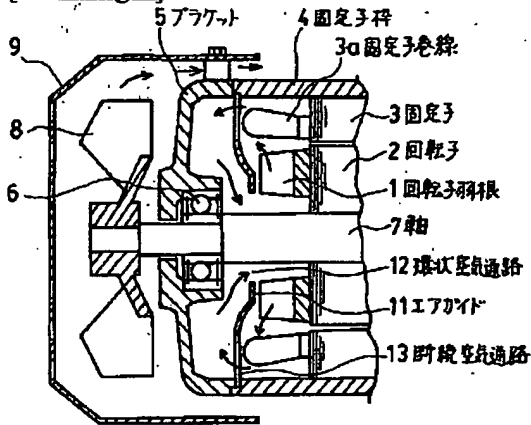
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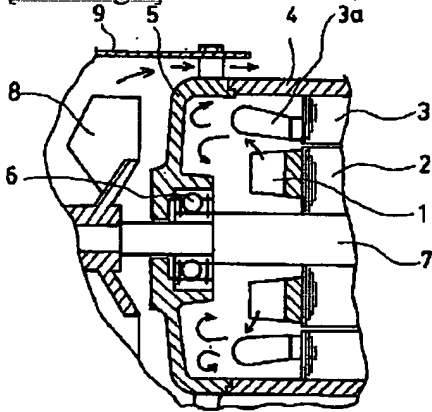
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## DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]



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PN - JP5003643 A 19930108  
PD - 1993-01-08  
PR - JP19910154978 19910627  
OPD - 1991-06-27  
TI - FULL-ENCLOSED FAN-CLOSED ROTARY ELECTRIC MACHINE  
IN - ITO TOMIO  
PA - FUJI ELECTRIC CO LTD  
IC - F16C37/00 ; H02K9/06

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TI - Totally enclosed fan-cooled electrical rotary machine - has annular air cooling guide plate between inside end surface of stator frame and blade array on endface of rotor  
NoAbstract

PR - JP19910154978 19910627  
PN - JP5003643 A 19930108 DW199306 H02K9/06 003pp  
PA - (FJIE ) FUJI ELECTRIC MFG CO LTD  
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AP - JP19910154978 19910627  
IN - ITO TOMIO  
PA - FUJI ELECTRIC CO LTD  
TI - FULL-ENCLOSED FAN-CLOSED ROTARY ELECTRIC MACHINE  
AB - PURPOSE:To improve cooling effects on the bearing and stator winding of a full-enclosed fan-cooled rotary electric machine so as to prolong the service life of the bearing.  
- CONSTITUTION:This full-enclosed fan-cooled rotary electric machine is provided with a stator 3 which is provided on the outside of a rotor 2 fitted with rotor vanes 1 at its end face with a gap in between, bracket 5 which covers the end section of a stator frame 4 fixing the stator 3, shaft 7 which is supported by a bearing 6 fitted to the bracket 5 in a freely rotatable state and fixes the rotor 2, outer fan 8 fitted to the end section of the shaft 7 passing through the bracket 5, and fan cover 9 which covers the fan 8. In addition, an annular air passage 12 is formed in the axial direction between an air guide 11 and the shaft 7 by fitting the guide 11 composed of an annular plate to the frame 4 and, at the same time, an intermittent air passage 13 which is intermittent in the circumferential direction is formed on the outer peripheral section of the guide 11 by bringing the inner peripheral section of the guide 11 closer to the rotor vanes 1.  
I - H02K9/06 ;F16C37/00